



STATISTICS  
DENMARK



Statistisk sentralbyrå  
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Statistics Sweden

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## Mission Report

from a short-term mission on Data modelling, SQL, DB management and  
PX-Web and eventually Intro to Data Storage and Archiving

9 June - 20 June 2008

TA for the Scandinavian Support Program to Strengthen the Institutional  
Capacity of the National Statistics, Mozambique

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## List of abbreviations

DBA	Database Administrator
DBA	Database administrator
DSt	Statistics Denmark
INE	Instituto Nacional de Estatística, Mozambique
IIS	Internet Information Server (A Microsoft product)
LTA	Long Term Advisors
STA	Short Term Advisors
MZM	Mozambique Meticais
NSI	National Statistical Institutes
PX	Family of Software produced by Statistics Sweden
Scanstat	Consortium between Statistics Denmark, Statistics Norway and Statistics Sweden
SCB	Statistics Sweden
SDMX	Statistical Data and Meta data exchange
SSB	Statistics Norway
SQL	Structured Query Language
USD	US Dollars
XML	Extendable Mark up Language

## 1 EXECUTIVE SUMMARY

*Scope of the mission* The Terms of Reference for the mission is included in the report as appendix 4. The mission was highly technical in terms of the training undertaken. The last 3 days of the mission was spent doing maintenance of the PX-Web system and some more general IT work was done to the portal [www.ine.gov.mz](http://www.ine.gov.mz).

*Follow up on mission in March 2007* A short term mission along similar lines where conducted in March 2007. The mission recommended dedicated hardware, more training and that members of the staff should be assigned to work with database tasks and MS-SQL server.

*The databases has now arrived* Since that mission, a version of MS-SQL 2005 has been installed on a server also serving the PX-Web Database. The NADABAS system in National Accounting has been converted from MS-ACCESS to MS-SQL, a web version of ESDM (Demographic Statistics / UNICEF) requiring MS-SQL is about to be put into production. A system called SIEWEB for on-line data capture for business surveys has also been installed on INE's secondary web server. SIEWEB also uses MS-SQL. A MS-SQL database is also used in the business register.

This means that the goal of using of relational databases at INE has now been realised. Also the recommendation on additional training has to some extent been realised by through this mission.

This is a very positive situation for INE, as it shows technical progress, that technical problems are solved and that new systems are being deployed. On the organisational aspects and especially on the staffing side more work is still needed.

Subject matter departments now expect IT to operate and maintain 5 different solutions. Each solution has its own individual designs and requirements. These new systems require staff, resources, and knowledge, which is not yet fully in place.

For them to operate efficiently over time it is very important that someone at the IT department takes on the role as Database Administrator. (DBA). Ideally at least two persons but at least one should be trained in MS-SQL Server to a Microsoft certified level.

The business statistics people at INES consider SIEWEB as a very important part of their future data collection. And expects that both INE and business in Mozambique will benefit form data collected over the internet. As Internet questionnaires will be both faster and more reliable than using paper based surveys. However this has also created new expectations and requirements to the IT Department in the areas of economic and business statistics. To full fill these new expectations the IT department must build new skill is both Database management (the DBA role) and in the operation of Internet based software written in dot.Net / ASP / ASPX.

*Very few new things* Most of the topics in this mission related to the SQL language and the MS-SQL has to some degree been covered in earlier missions by this consultant and also in earlier missions by Søren Netterstrøm Statistics Denmark. As the subject covered can be both complex and abstract a long and steep learning curve should be expected for the staff of INE's department.

The full understanding of how to work relational databases and their value to INE will only come as the staff members of the IT-department builds up their skills and knowledge. This will only happen if and when the IT-department defines and take on relevant development projects coming from inside INE and it's Strategic Plan 2008-2012.

This will however not happen without a person with sufficient skills, knowledge and an understanding of both Statistics and IT.

*My opinions* All opinions in this report present's my best professional views and knowledge as a consultant but are not necessarily shared by Statistics Denmark.

*Thanks to all at INE* Finally I would like to express my thanks to all officials and individuals meet during the mission. They all provided me with the necessary information in a kind and open atmosphere which greatly facilitated my work in Mozambique. But specially, I would like to thank Mr. Lars Carlsson for being an excellent host and for a very constructive sharing of his thoughts on the project.

## 2 INTRODUCTION

Administrating, maintaining and querying relational databases is part of everyday life at all National Statistical Institutions. The querying and data analysis work is usually done by the subject matter departments which takes full responsibility for the statistical data stored in the database. The IT department usually takes care of more technical things like installing the server, managing it (backup, software upgrades and user administration) and sometimes assists in the data entry and analysis process.

For this type of work sharing the IT department and the subject matter departments must have the proper technical skills and a fundamental accept of each others role in process.

To implement some of the goals in INE's strategic plan for 2008 -2012 will be necessary for INE to use database to a much larger degree than to day. The need for a database of classifications and the ambition to build a national data archive for statistics are the main drivers in this process. But also software solutions sought by the subject matter divisions (SIEWEB and NADABAS) or introduced by donors like Unicef (DevInfo / ESDEM) will require the IT department to design, program and maintain databases and database servers.

### 2.1 The Database Situation

In the summer of 2008 INE will be running 4 different MS-SQL databases:

*PX-Web* MS-SQL database for user statistics and stored query's for the PX-Web system. PX-Web is part of the Internet and is managed and used by the IT department.

*ESDEM* For various donor considerations it is necessary to run a web enabled version of ESDEM. The latest version of ESDEM is also requires a MS-SQL database. The ESDEM system as a project belongs to the subject matter department on Demography who expects the IT department to be able to deploy and operate the software. The documentation of ESDEM software is not sufficient for the system to be operated and maintained without very good network and database skills at the IT-Department.

*System for data capture - SIEWEB* A system for data collection has been installed by a consultant from Cap Verde Mr. Laurent Taveres. As for ESDEM the system is relatively complex and requires both management and support from the IT Department. To develop new surveys on SIEWEB and to maintain the system without continues support from the INE Cap Verde the IT Department at INE MZ must expand on skills already in place but must also learn new skills.

*Takes new skills* For SIEWEB to operate efficiently the DBA role must be undertaken. To keep the web installation up and running and to deploy new surveys someone in IT must have a basic understanding of the dot.Net / ASPX software the program is written in but also of the MS-SQL server it self. I therefore think that it is important that a person like INE's Webmaster Mr. Nhane is given the opportunity to learn these skills so that he can support the department of business statistics in their use of SIEWEB.

It seems that the business statistics department has high and perhaps also non full filled expectations to the IT department when it comes to the running of SIEWEB and the business register (FUE). This could perhaps also be solved through the assignment of a person in the IT department to work part time with SIEWEB.

*NADABAS* NADABAS the most central system in National Accounting was converted from MS-Access into MS-SQL (Express version) do to performance considerations.

PX-Web, ESDEM and SIEWEB is installed on the MS-SQL Server called STATBANK. This server is sharing the same hardware as INE's secondary web server and is therefore not directly accessible through the INE network. NADABAS is located inside the network on one of the print servers. From a security point this is not very satisfactory.

## **2.2 Consequences for the IT- Department**

*A burden on the IT department* The fact that INE already has 4 database systems working creates a situation where it is absolutely necessary that the IT Department sets aside the persons and the time to understand how to work with these systems. 3 of the 4 systems now operating has been initiated by subject matter divisions and not by the IT department. Unfortunately experiences shows that the IT Department is expected to take both ownership and responsibility of new systems and make them work. However this can not be done without time and resources.

### *A DBA must be assigned*

Last time training in MS-SQL Server and in the use SQL language was given was in March 2007. Then it was recommended that additional training should be provided and that specific persons should be appointed to work with MS-SQL Server. This mission has provided the most basic and necessary training. However the systems already operating needs continues backup and maintenance. Otherwise the new systems both can and will stop working.

A basic set of skills is now available through out the IT department. The next logical and necessary step is to assign the responsibility for the MS-SQL database to a specific person. This person must take on the responsibilities of the role as Database Administrator. Assigning user rights, make back ups and keeping the databases software configuration up to date through service packs and patches.

### *Not a network administrator job*

The DBA is normally performed in very close cooperation with the network administrator. How ever they are different jobs and they require different skills. A database created in MS-Access on a network file server will take care of it self and be backed up and restored like any file using standard methods. However back up of MS-SQL databases must be done from inside the Database software. And user rights must be controlled not only from the Windows Server but also from inside the database engine itself. These tasks can only be done by someone who understands databases and uses the software regularly.

### *Data can be lost*

So if this role is not assigned and taken proper care of there is a real risk that can be lost. Although 3 of the 4 databases are initiated outside the IT-department, its IT department that will be blamed if this happens. Therefore the MS-SQL server should be integrated into INE's backup procedures. It security settings should be audited. And it' the sharing of hardware with the secondary web server should be reconsidered.

## **2.3 PX-Web**

The last days of the mission where programmed to do some maintenance work on INE's PX-Web installation. Together with Mr. Nhane small changes where made to the statistics function in the PX-Web software so it now works as intended. Also changes in the way Excel files are downloaded from the Internet where made. PX-web is not directly depended on the MS-SQL server but uses a database on the server to store information about visits and to allow users to store questions. The understanding of MS-SQL Server and of the SQL language makes it much easier for the webmaster to analyze the use of system.

## **2.4 ESDM**

During the mission the webmaster and I installed the web enabled version of the Dev info package. The local Mozambique version is known as ESDM. The web interface is also dependent on the MS-SQL Server. We also migrated data from INE's CD-Rom version of ESDM to the MS-SQL database. Although the Dev Info seems to be well supported by UNICEF the actual

installation process was both time consuming and cumbersome. It also required some dialog with their support department.

*Slow and in need of updating*

Although slightly out of the scope for this mission I will like to stress that the relevant subject matter department at INE should make sure that the data inside the DevInfo application is updated before it is integrated into the [www.ine.gov.mz](http://www.ine.gov.mz) portal.



Also outside of DevInfo should be adapted to INE's general look and feel for Internet and publications. It is not clear if this can be done inside INE or should be done by Unicef's DevInfo support.

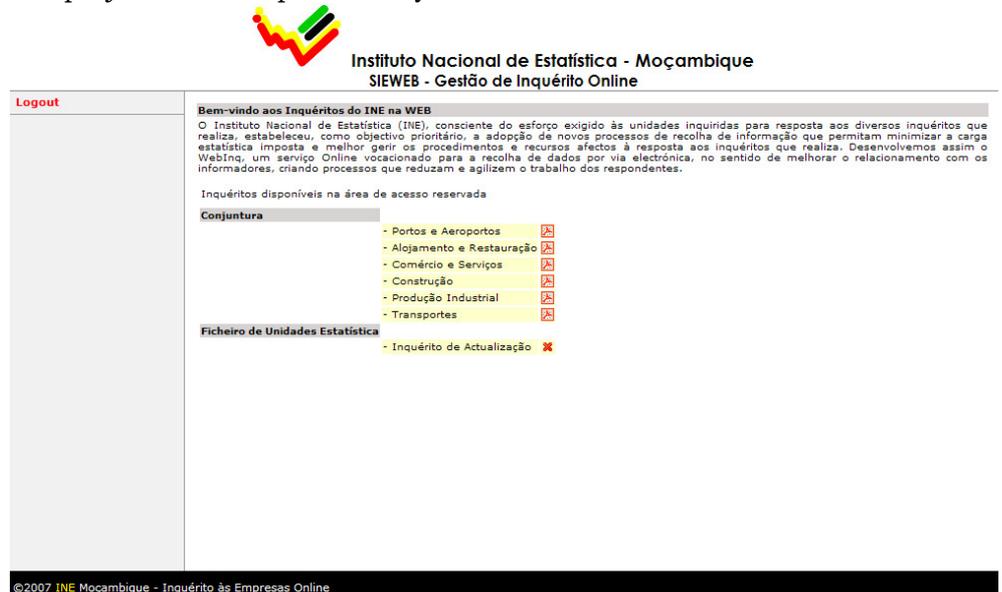
The design of DevInfo is visually appealing but users like INE should note that it requires large amounts of band width and therefore very slow to access. Also the user interface can be difficult to use for first time users or users not particularly interested in following the Millennium Development Goals.

*Single source dissemination*

The use of both ESDEM and PX-WEB is not optimal as the data in the two systems does not entirely cover the same subject areas. Also there are no guaranties that the shared data is in fact 100% similar as the data may have different sources inside INE. In the long term it is still important that INE develops a single storage of data which can be used as a single source for all dissemination purposes ie print or paper or different web services. PX-WEB is updated regularly with data from the national accounting domain which are not found in ESDEM. Looking at the log files form PX-WEB it is clear that the system is actually liked by the users. This can hopefully be used as an argument for creating better and more efficient ways of updating data. From the dissemination point of view it is also very important that senior management at INE understands that a NSI today is what it publish on the Internet and not what it prints. An that what it can publish on the Internet must ultimately come from databases.

## 2.5 SIEWEB

A system for the collection of data through the internet called SIEWEB provide through the NSI of Cap Verde has been installed at INE. Assistance in this project has been provided by Mr. Laurent Tavares.



Working together with the webmaster the system was also installed on INE's secondary web server and the proper database connections where made. The course on the use of SQL will hopefully eventually allow the IT department also to extract data from SIEWEB in a direct and efficient manner. However as the SIEWEB database fills up with questionnaires form companies in Mozambique is also very important that the database is taken proper care of.

*Basic understanding of application is needed*

As mentioned earlier also the SIEWEB application it self is written in dot.Net / ASPX. INE MZ has no skills in this technology. Although it is not necessary to understand the technology behind to a level where INE MZ can develop it's own applications it is necessary that staff at INE MZ have enough understanding of ASPX / dot.Net to interact with and receive support from Mr. Lavrent Taverne who has developed the application.

## 2.6 Data modeling

Data modeling can be seen as a very theoretical exercise. It is also very much a question of applying experience, common sense and some very basic logical it rules to the real world entity or business process one wants to model. This experience will only come to the staff at INE through a lot of trail and errors process designing database and applications, it can not be thought in the class room.

It is also mainly an intellectual process for which you must have not only IT knowledge. You must also have both interest and knowledge of the subject matter you are modeling. This interest in statistics as a subject is also important in tasks likes making tabulations and analysis of data. This understanding and interest of the statistical subject matter is unfortunately often abstract if not directly alien to the IT-Staff tasked with doing the design and tabulation.

## 2.7 Training undertaken during the mission

In the TOR it was originally planned to have training for 5 days starting on Tuesday 10 and ending on the following Monday. However things always take longer than planned so the workshop where also continued on Tuesday the 17 June.

The training was centered around the most basics forms of query's and operations. Short demonstrations and examples where followed by practical tasks and exercises. The training provided is not sufficient for any of INE's staff to undertake a full time roll as a DBA or as Database programmer.

*Practical experience is needed*

Data modeling can seem very theoretical and almost like a black art for people new to the subject. However the theoretical considerations are best left in the class room a real skills and understanding will only come from practical day to day work with the subject.

*Modeling a nomenclature*

First at simple fact table of the consumer price index was created. Then a more difficult effort to model the nomenclature of foreign trade was done. The effort involved both theoretical design discussions and practical work with tables in a database. Although it was difficult and quite abstract this type of learning by doing is absolutely necessary for building long term confidence.

An international stand data model dealing with nomenclatures and standards is available and INE should adopt this model in the long term. The model is known as the Neuchatel model and has been implemented at Statistics Denmark and Statistics Norway. As such the Scanstat consortium will recommend INE this data model for storing its classifications.

## 2.8 Follow up training

As mention earlier more training in the DBA role is necessary. As the present program is about to end there are no provisions for this type of training inside the Scandinavian program.

However training will be provided in for one week in July by Mr. Søren Netterstrøm on programming in Visual Basic. This will allow INE programmers a different approach to work with databases as it will demonstrated who applications for data entry and data extraction be created. It is always a balance of what to do in the database and what should be done by the application layer. But at least this training session and the VB session will give the programmers at INE a understanding of the interaction between databases and applications.

*SIEWEB*

As mentioned under the SIEWEB heading training should also be provided in asp / aspx applications and how they interact with databases and web servers. This type of training is truly multi disciplinary as it requires some a priori knowledge of networks, servers, databases programming and internet technology.

## 2.9 Oracle

According to the discussions the use of Oracle is be considered on the national level. It is in this perspective important to remember that when you talk Oracle you can do it in two very different meanings. Oracle is the name a relational database engine, which can be queried using the normal SQL syntax. From this perspective it is not to different from the MS-SQL from Microsoft. But Oracle is also used as a (specially for a lot of non IT literate manages) reference to a number of application products sold by the same company. These products deals with common business tasks like accounting or HR / Staff management, but are all based on the Oracle database engine.

*Oracle <> MS-SQL* In terms data modeling, data entry and data extracting there are no real noticeable differences between MS-SQL and Oracle. The difference at least in a European context, is the price. Oracle is generally significantly more expensive to buy but is also much more difficult and complex to manage from a Database Administrator perspective.

If administrative systems from Oracle are implemented at INE this will also force the IT department to take care of these systems and put more pressure on the IT Department to nominate a full time Database Administrator.

*Thanks to all at INE* Finally I would like to express my thanks to all officials and individuals meet during the mission. They all provided me with the necessary information in a kind and open atmosphere which greatly facilitated my work in Mozambique. But specially, I would like to thank Mr. Lars Carlsson for being an excellent host and for a very constructive sharing of his thoughts on the project.

## 3 RECOMMENDATIONS

The consultant would like to make the following recommendations based on the work undertaken during the mission:

*Appoint a DBA* Four MS-SQL databases are now running at INE. As they all play important roles in INE's production they must be taken well care of. Therefore it is absolutely necessary that a person with the proper qualifications is appointed to act as a Database Administrator.

*Security and backup* SIEWEB and web enabled ESDEM are now installed and will soon be put into operation. Both can and will hold production data. In fact the entire purpose of SIEWEB is to collect data and. This makes these databases a very important part of INE and they must be secured and back must be made regularly and according to schedule. Procedures for this should be established as soon as possible.

*IT-audit* Databases and Internet servers and their security setup must also be included in future IT-Audits.

<i>Continue the learning process</i>	As data modeling and design is more a question of practical experience than of theoretical knowledge it is recommended that INE staff continues to work through different classifications and surveys creating small databases for these. The databases created may not be put into production / operational use but is the only way for staff at INE to learn the necessary skills.
<i>Further training</i>	It is recommended that further training is provided but it must be build and designed around specific surveys / applications need by INE if it is to be efficient and provide good value for money.
<i>SIEWEB</i>	The installation of SIEWEB has created a need for skills in aspx / dot.Net and databases at INE.
<i>Database of Classifications / Standards</i>	It is part of INE's strategic plan to have a database of classifications / nomenclatures. Each classification can be modeled individual but an international stand data model does in fact exists. It is commonly known as the Neuchatel model. It has been developed through Statistics Denmark and Statistics Norway. A web interface for presenting data in the model is available through the Scanstat partners.
<i>Continue to pursue single source dissemination through databases</i>	It is recommended that INE continues to pursue the use of single source dissemination through the use of databases. Only through this method it is possible to assure that all data are correct and timely updated. Systems like SIEWEB will provide both for both more and faster statistics to be compiled. If they are to be disseminated in a timely fashion then the dissemination must be done through dynamic databases.
<i>Staff</i>	The programming and software development skill varies greatly between the staff members. It is important that INE continues to develop the skills of the most motivated staff members by assigning them to additional local training. And perhaps more important assigning them concrete and demanding development tasks where the results can be seen to have direct value to INE.
<i>Computers in the IT department</i>	The workstations used by the staff of the IT department are beginning to show their age. The disk drives of the computers are full leaving very little space for installing new and needed software. Not all computers are up to date in terms of service packs and general security updates from Microsoft. If it is not financially possible to procure new computers a standard installation should at least be decided and then implemented on all computers. This recommendation is fully in line with best practices of IT-management.

## **APPENDIX 1 List of persons met**

### **INE**

Mr. Tomas Bernardo, Mr. Anselmo Leonardo O. Nhane

The following persons participated in the training:

Mr. Antonino Reginaldo A. Francisco

Mr. Anselmo Leonardo O. Nhane

Mrs. Beatris Maria Ismael Manjarte

Mr. Calado Pereira Fijanto

Mr. Celso Azarias Machava

Mr. Socrate Tiago

Mr. Tomas Bernardo

### **Scanstat Consortium, LTA:**

Mr Lars Carlsson, Team Leader

## APPENDIX 2 List of Literature

All mission reports from the Scandinavian programme are available online at: [www.dst.dk/mozambique](http://www.dst.dk/mozambique)

For this mission I would like to refer to the following reports:

Mission Report from a short-term mission on: PX-Web by Jesper Ellemose [MZ:2007:09](#)

Mission Report from a short-term mission on: *Data Modelling and SQL* by Jesper Ellemose [MZ:2007:4](#)

Mission Report from a short-term mission on: *PC-Axis and the Macro Data Warehouse* by Jesper Ellemose [MZ:2006:08](#)

Mission Report from a short-term mission on Data Modelling 31 January – 4 February 2005 by Søren Netterstrøm [MZ:2005:08](#)

Mission Report from a short-term mission on *Internet Database Pilot Project* by Jesper Ellemose [MZ:2004:17](#)

Mission Report from a short-term mission on *The Creation of an Output Database pilot* by Jesper Ellemose & Annegrete Wulff [MZ:2003:24](#)

Alison Balter: Microsoft SQL Server 2005 Express in 24 Hours, Sams Publishing 2006, 436 pp

Jonathan Gennick: SQL Pocket Guide, O'Reilly 2004 pp154

Ralph Kimball, Margy Ross: *The Data Warehouse Toolkit – The complete guide to dimensional modelling*, 2<sup>nd</sup> ed Wiley 2002 416 pp

## APPENDIX 3 Activities during the mission

The following activities were conducted during the mission:

- Monday 9 June* Meetings with Team Leader and Main counterparts to discuss the purpose of the mission and its implementation.
- Tuesday 10 June* Installation of MS-SQL Server express on a number of workstations  
Training and discussions on: *The Basics of the SQL language*
- Wednesday 11 June* Training and discussions on: *The Basics of the SQL language and Start of Modelling*
- Thursday 12 June* Training and discussions on: *Modelling aggregated CPI as a Star Model*
- Friday 13 June* Training and discussions on: *SQL repetition working with Views*
- Monday 16 June* Training and discussions on: *Management of the MS\_SQL Server. Role of the DBA and management of users*
- Tuesday 17 June* The Trade Code Nomenclature as a case.
- Wednesday 18 June* Installing the ESDM database on INE's secondary IIS. Installing ESDEM database software on INE's web based MS-SQL server.
- Thursday 19 June* Maintenance of the PX-Web installation at INE. Small modifications to the statistics function and to the save as EXCEL function.
- Friday 20 June* Meeting with Counterparts to present and discuss the mission report, results and recommendations.

## APPENDIX 4 Terms of Reference

DRAFT

### TERMS OF REFERENCE

#### for a short-term mission on

Data modelling, SQL, DB management and PX-Web  
and eventually Intro to Data Storage and Archiving

9 – 20 June, 2008

within the Scandinavian Assistance to Strengthen the Institutional Capacity  
of INE/Mozambique

*Consultants:* Jesper Ellemose Skou Jensen

*Counterparts:* Tomas Bernardo, Anastácia Judas Honwana and Anselmo Nhane.

#### Background

It was originally the plan for INE to develop a Data Warehouse system based on 3 database components: A Micro Data Warehouse, A Macro Data Warehouse and a Dissemination Database.

The Dissemination Database is already up and running based on the Scandinavian PC-Axis / PX-Web platform, also used by FAO.

The Data Warehouse strategy and a road map for implementation is described in greater detail in a *Short Term Mission on Data Modelling 31 January - 4 February 2005* by Søren Netterstrøm, [MZ:2005:08](#). The mission then was directed at Anastacia Honwana, Clara Panguana, the developer group at DISI and the LTA on IT Karsten Bormann. The report by Lars Thygesen a *Short Term Mission It Management and Strategic IT use* from September 2006, [MZ:2006:10](#), recommends increased focus on the Data Warehouse. However a need for a more practical / hands approach and training in the related subjects of Data modeling and working with Databases is recognized by INE (DISI) and therefore a mission on Data modeling and SQL was discussed and requested during the visit by Lars Erik Gewalli in November 2006. A mission on this theme was also done 19/2 – 1/3, 2007, [MZ:2007:03](#). The now proposed mission can be seen as a direct continuation of the previous and has the advantage of being accompanied by a mission on Visual Basic during the second week. The mission will also spend 3 days of follow up on a previous mission on PX-Web 3-14/12, 2007, integrating it with MS-SQL express, [MZ:2007:09](#).

A full database system managed with a general language as VB will give INE opportunities to store and backup data in a more efficient manner and to assign different data access rights do different people inside INE.

Also the “though” data management discipline which is a part of full scale database systems will help improve the data quality of INE’s surveys. Further more an increased used of databases will allow INE to develop more ad hoc Client – Server applications.

As a low cost but high tech introduction to database technology is suggested to use the Microsoft MS-SQL 2005 and Visual Basic 2005 in the Express versions. These are provided free of charge by Microsoft and has all the functionality of Microsoft’s commercial versions. There are limitations in the amounts of data that it is possible to store in Express version. However for training and familiarization purposes the Express version is more than sufficient.

INE has an ambition to follow the international SDMX standard for exchange of statistical data. Although the PX-family has a series of build in functions to support publishing according to the SDMX standard. SDMX files are usually best created from databases and therefore a supplement to the dissemination database must be created.

In order to provide INE with a practical skill building it is planed to build a series of missions around one or two development cases. Each case should lead to a working database.

SDMX is based on XML and XSLT is recommended that training is also provided in this field to INE staff before the end of the year. CPI and National Account data are the data most likely to be requested by international organizations in SDMX-ML. INE may therefore like to enter data from these two subject areas in to a Micro / Macro Data Warehouse model before the end of 2007.

Drawing on Visual Basic and XML it should then be possible for INE to construct a Web service with data in the SDMX-ML format.

Also the LTA on IT left INE by the end of August 2007. Instead it was planned to have a series of short term mission providing INE with gap filling, reflections, discussions and second opinions in the area of IT. This mission should be seen in this context.

### **Objective**

The objective of this mission is to strengthen the practical and theoretical knowledge of data modeling at INE, through the use of real data from the Consumer Price Index as a case for building a database in MS-SQL 2005 Express.

To demonstrate basic functions in the SQL language to extract, manipulate and present data from the database.

The mission will lay the ground for the mission on Software Development using Visual Basic which will concentrate more on the development of Client-Server applications with MS-SQL Express as the database engine. Both missions will through hands on training show how data is entered and extracted to a database from other file formats.

### **Expected results**

- A revision of the MS-SQL 2005 Express Installation at a number of workstations for training purposes
- A repetition of basic database concepts
- An implementation of a database structure for the CPI data
- A continuation in the exploration of the SQL language
- An introduction of basic OOP concepts
- More familiarity with MS-Query as a tool to extract data from MS-SQL, Access and CSV files
- Prepare for a follow up mission on application development using Visual Basic Express – this mission should concentrate on building client server applications with MS-SQL Express as the database behind.
- Mission report that comments on the objectives and achievements and include recommendation about of the next steps on improving the general modeling and programmatic skills inside INE

### **Activities**

- A meeting with the counterparts on the objectives and expectations of the mission.
- First Week: Classes / Workshops on Data modeling, MS-SQL 2005 Express, basic SQL statements, and MS-Query will be conduct on 5 working days (Tuesday to Monday). The workshops will be from 8.30 to 12.00. They will consist of a combination of short technical / theoretical briefings followed by hands on experience.
- Second Week: On the Monday a handover to the Visual Basic mission will be done. Then 3 days will be spent on follow up on PX-Webb issues together with the INE responsible.
- A meeting towards the end of the mission with Counterparts to present and discuss the results and recommendations

### **Tasks to be done by INE to facilitate the mission**

- Elaborate ToR for the mission
- Invite and prepare the participants of the course
- Prepare a sufficient number of computers for the training
- Prepare and supply the consultant with necessary documents and information, such as mission reports, strategies, plans etc.
- Supply good working conditions for the consultant

### **Consultant and Counterpart**

Consultant: Jesper Ellemose Skou Jensen from Statistics Denmark

Main counterparts:

Anastácia Judas Honwana, Tomas Bernardo and Anselmo Nhane.

### **Timing of the mission**

Two weeks (9– 20 June, 2008).

### **Report**

The consultants will prepare a draft report to be discussed with INE before leaving Maputo. They will submit a final draft to INE for final comments

within one week of the experts have returned to work. Statistics Denmark as Lead Party will print the final version within 3+ weeks of the end of the mission. The structure of the report should be according to Danida format.

The Counterpart has to ensure that the final printed report has at least a summary in Portuguese if the main report is in English – or vice versa.

*These Terms of Reference were prepared by*

*Day* / /  
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*Approved by/in the name of the President of INE*

*Day* / / .....

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*Prepared by:*